

The **American Fertilizer**

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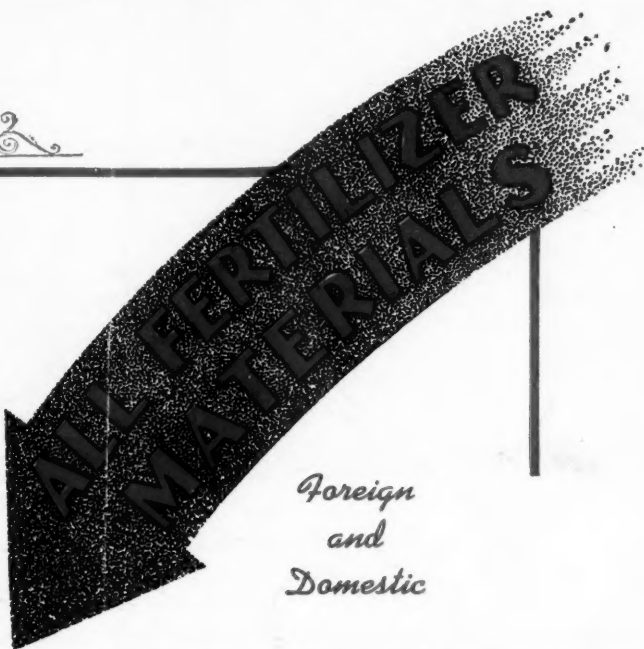


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MENTION "THE AMERICAN FERTILIZER" WHEN WRITING TO ADVERTISERS.

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AMERICAN FERTILIZER

"That man is a benefactor to his race who makes two blades of grass to grow where but one grew before."

Vol. 100

JANUARY 29, 1944

No. 3

Industry Advisory Committee Discusses Current Problems

THE Fertilizer Industry Advisory Committee met at Washington on January 26th, P. H. Groggins, WFA, presiding. Also present: H. M. Albright, George Cushman, Ralph B. Douglass, Franklin Farley, George W. Gage, N. E. Harman, Sidney B. Haskell, M. H. Lockwood, John L. Morris (for Wm. B. Tilghman, Jr.), M. H. McCord (for C. F. Hockley), O. J. Noer, Walter S. Rupp, John E. Sanford, C. D. Shallenberger, Nelson T. White, Fred J. Woods, J. A. Woods, members of the Committee; H. B. Baylor, Richard Bradfield, Charles J. Brand, R. W. Cummings, M. K. Derrick, N. H. Eason, J. A. Howell, George W. McCarty, G. S. McIntosh, H. H. Meyers, A. F. Miller, D. S. Murph, C. L. Neill, H. R. Smalley, J. W. Turrentine, N. J. Volk, M. W. Whipple, R. E. Yoder, by invitation; C. R. Carson, T. W. Davies, T. L. Jefferies, W. E. Larkin, L. G. Porter, J. P. F. Ritz, W. F. Watkins, Fertilizers Division, WFA, USDA; Donald W. Aitken, T. L. Ayers, N. E. Dodd, Albert C. Howard, O. E. Overseth, F. W. Parker, B. T. Shaw, J. H. Stallings, other USDA; J. C. Freeman, Cedric G. Gran, W. T. Hart, Henry A. Huschke, R. A. Payne, Paul Poirot, OPA; S. L. Clement, B. A. Ford, R. R. Hull, Dale C. Kieffer, Paul J. Prosser, Edmund Rowland, WPB.

Production-Increment Crops

At the December 9th meeting, the Committee approved a recommendation by the mixed fertilizer subcommittee that corn, forage crops, permanent pastures, sugar beets, small grains, and other crops recommended by State officials be designated as production-increment crops. WFA accepted the recom-

mendation subject to the concurrence of the Agricultural Adjustment Agency. Since that time, it was reported, the War Food Administration, upon the recommendation of AAA, has decided to designate pastures and forage crops as production-increment crops throughout the country.

Agricultural Adjustment Agency

N. E. Dodd, chief, spoke of the AAA position in the food production program. He expressed the view that the greatest immediate increase in the food supply can be obtained through greater and more effective utilization of pastures and forage crops. Consequently, AAA feels that for the present the emphasis should be on the use of nitrogen for pastures and forage. Mr. Dodd explained that since the AAA was created by the Congress, conditions have changed, and the same powers and organization formerly used to control crop production are now being used to increase production. The responsibility for meeting the crop production goals has been assigned to AAA by the War Food Administrator. In discharging that responsibility AAA is interested in maximum production of fertilizer and its distribution to areas where it is needed to produce essential crops and wants to see the maximum amount handled through commercial fertilizer channels. Successful distribution and utilization of fertilizer for promoting food production requires cooperation by the industry, the farmers, and the interested governmental agencies.

Agronomist's View of the Fertilizer Program

Dr. R. W. Cummings, head of the Department of Agronomy at North Carolina State

College and one of the agronomists who is serving WFA in an advisory capacity, made some observations regarding the fertilizer distribution program as embodied in FPO 5: The contacts brought about by the war have resulted in a better common understanding between the agronomists and members of the industry. The agronomists' part in the program is largely centered around the selection of grades and the most efficient use of fertilizer to increase production. The reduction in the number of grades, the standardization of grades, and the increasing concentration of plantfood in fertilizer are trends which should and will continue. Agronomists, in performing their functions, should have for their aid complete information as to supplies, grades, uses and methods of distribution, and must look to effectiveness of the available fertilizer. They have not always understood some changes made in their recommendations. Simplification of FPO 5, to the extent possible, is desirable. As shortages of materials become less pronounced, the restrictive features of the order might be eased, particularly as to crop uses. Constructive features of the order should be retained, along with such restrictions as are necessary and enforceable. The agronomists expect to have their complete grade recommendations ready for submittal to the Committee at the May meeting.

Organic Nitrogen

The subcommittee reported that some fertilizer manufacturers have bought the 70 per cent of organic nitrogenous materials authorized by FPO 12, Revision 2, while others have not yet bought the full amount authorized, and recommended that for the present no change be made in the order. In view of possible improvement in the organic materials situation, the subcommittee will keep in touch with WFA and, if production conditions warrant, may recommend, a little later, that the 70 per cent authorization be increased. The report was approved by the Committee and accepted by WFA. The War Food Administration has authorized the purchase of two-thirds of the 40,000 tons of oilseed meal earmarked for fertilizer purposes, and the remaining one-third will be authorized for purchase at once. The oilseed meal situation has eased up to some extent in the past two weeks. It is expected that 40,000 tons, and possibly more, of oilseed meal will be available for fertilizer again next year.

Chemical Nitrogen

WPB reported that arrivals of Chilean nitrate of soda through February are expected

to total 347,000 tons, boats having been released for the February shipments. The preliminary set-up contemplates arrivals of 150,000 tons in March. If this program is carried out, the importation of the 500,000 tons which had been definitely planned will be practically completed by the end of March, and any arrivals after that time will represent an improvement in the import situation.

Peak consumption of solutions came in December, with 14,500 tons, as compared with 14,400 tons for November and 11,900 tons for October. The drop since December has been slightly sharper than the build-up, figures indicated for January and February being 13,400 tons and 11,600 tons, respectively. Total chemical nitrogen for mixing purposes east of the Rockies for the first six months of the year was 172,291 tons of N. If the trend with respect to solutions is fairly indicative as to other materials, an estimate of 344,000 tons of N for mixing in that area during the whole year probably would be a little high.

Of the 605,000 tons of N (chemical nitrogen) set-up for the continental United States for the whole year, 43 per cent was allocated during the first six months; by the end of January 54 per cent, and by the end of February 65 per cent (indicated), will have been allocated.

The subcommittee on inorganic nitrogen reported that valid estimates of the nitrogen requirements for 1944-45 cannot be made at this time; that the supplies of nitrogen originating in North America, and the progress of the war, will largely determine the contribution of the North American Continent to supplies available to agriculture, and that the facts now available to the subcommittee do not permit the subcommittee to make any recommendation at this time. It was recommended that the Nitrogen Unit of WPB be requested to develop the facts and probabilities and submit to the subcommittee, prior to the next meeting of the Committee, (1) an estimate of total supplies of synthetic anhydrous ammonia which can be made available from U. S. plants wholly or partly built and/or operated by public funds, after war requirements and essential industry are cared for, such estimate to be based on expected conditions as to production, as of July 1, 1944; (2) a statement as to the then-expected net capacity for production of conditioned ammonium nitrate, available to agriculture, from plants built directly or indirectly from public funds; and (3) a statement on the status as to supplies of ammonium nitrate and other materials which may be expected from Canada, during the year beginning July 1,

1944. The subcommittee emphasized the necessity of adequate provision for storage, pointing out that the lack of storage facilities will in effect reduce the usable production capacity. The report was approved by the Committee and accepted by WFA.

Upon suggestion of the subcommittee the Committee voted their appreciation of the work done at the Beltsville laboratory, under Dr. Parker's direction, in developing methods in connection with the preparation of ammonium nitrate so as to make its use as fertilizer practical.

Distribution of Ammonium Nitrate

It was reported that the Commodity Credit Corporation has assumed responsibility for distributing Ordnance-produced ammonium nitrate to fertilizer manufacturers, and that distribution will be made through Associated Cooperatives, Inc. For the present the per ton price will be \$50.00 plus freight from the nearest Ordnance production point.

Government representatives called attention to some problems and considerations in connection with the matter of price determination, such as:

(1) There is not adequate information as to when and where and in what amounts the material will be made or when and where and in what amounts it will be used, and so the element of freight charges is an uncertain one.

(2) Under the temporary legislative authority under which CCC is presently operating, that agency is not in position now to absorb any losses, and consequently the ammonium nitrate distribution program must be self-sustaining.

(3) Ordnance is not allowed by law to sell below its cost of production.

(4) The military appropriation Act for 1944 specifically provides that none of the funds appropriated in the Act shall be used for the payment of any subsidy on agricultural or other products.

(5) The material should be priced equitably and in such manner as to contribute to the full utilization of the available supply.

(6) There is a possibility of some changes in the price structure if some of the present conditions should change and when fuller pertinent information as to production and movement is available. The Committee decided to take no action with respect to the ammonium nitrate distribution program.

Potash

WPB reported that the potash situation has shown considerable improvement. Production has increased slightly, due principally to

the increased mining of manure salts. Because of changing conditions, some potash previously earmarked for export has been made available for domestic consumption. It now appears likely that, in general, potash allocations to fertilizer manufacturers will be approximately 100 per cent of the base-period quantity. The date of issuance of Period 3 allocations has been moved up to approximately February 1st to provide fertilizer manufacturers maximum time to arrange with producers for earliest possible delivery schedules.

Sulphuric Acid

WPB reported that in the Southeast about 24,000 tons of 60-degree sulphuric acid were delivered from Ordnance plants to superphosphate manufacturers in January, and approximately 25,000 tons are scheduled for delivery in February. These figures are about double the monthly deliveries for the later months of 1943. The difficulties of the long hauls have been partly met through the voluntary pooling of tank cars. Most requirements of acid for superphosphate have been satisfied in that area.

Superphosphate

The subcommittee reported that on the basis of the WFA estimate of 8,500,000 tons of mixed fertilizer, including ammoniated superphosphate and P-K mixtures, as requirements for distribution in 1943-44, and also 900,000 tons of superphosphate for direct application, including export requirements, the subcommittee calculated the total requirements of superphosphate as 5,620,000 tons, basis 18 per cent. In view of increasing production, the production total should reach 7,197,000 tons, basis 18 per cent, including triple superphosphate that may be available for domestic consumption. Deduction of the fertilizer industry distribution, superphosphate already contracted for by AAA, and superphosphate required for defluorinated superphosphate, would leave a balance of 867,498 tons, basis 18 per cent, as of June 30, 1944. The subcommittee pointed out that, because of lack of storage facilities, the estimated production of 625,000 tons each for the months of May and June, 1944, can only be accomplished if this quantity is purchased and moved by some governmental agency at about the time of production and from the source of production; and that the producers of this material must, therefore, have assurance adequately ahead of time that this May and June production will be purchased and moved accordingly, as

(Continued on page 22)

Rate of Plant Food Absorption by Cotton*

ABSORPTION of nutrients and growth of cotton plants do not occur rapidly until time of boll formation, being very slow during the seedling stage and increasing somewhat—but still slowly—from seedling to early square.

Since more commercial plant food is applied to cotton in this country than to any other crop, these results obtained by the Georgia Experiment Station, Experiment, Ga., dealing with the amounts of plant food absorbed and the rate of uptake of the nutrients are of considerable importance. This work, conducted in 1939 and 1940, was recently reported by L. C. Olson and R. P. Bledsoe in Georgia Experiment Station Bulletin 222.

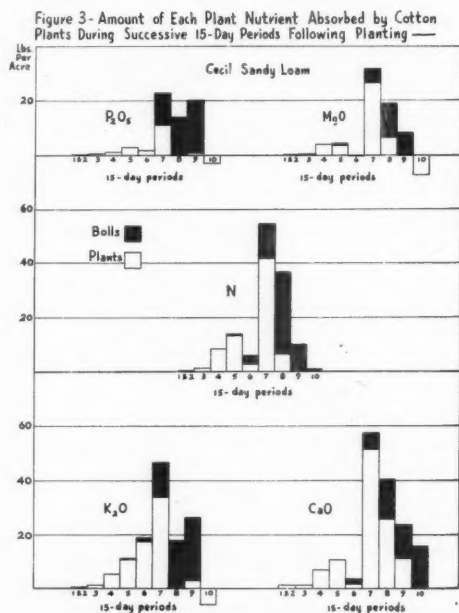
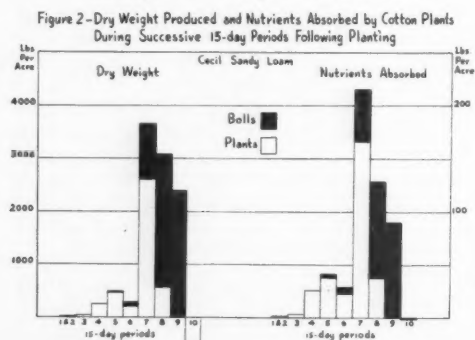
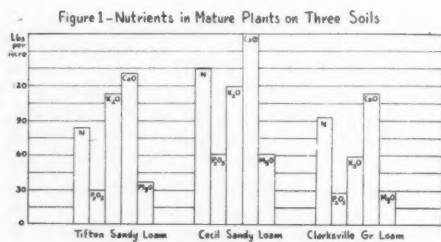
Cotton was grown on Cecil sandy loam, Tifton sandy loam, and Clarksville gravelly

loam, representative soils of the Piedmont, Coastal Plain and Limestone Valleys. Plant food equivalent to 600 pounds of 6-6-6 fertilizer per acre was applied on Cecil; and to 600 pounds of 6-8-6 on Tifton and Clarksville types.

Samples of the above-ground portion of the plants were taken at four stages of growth: seedling, 30 to 60 days after planting; square, 75 to 90 days; boll, 110 to 130 days; and mature, 130 to 150 days after planting. At seedling stage, 100 or more plants were collected for each sample; while only 5 to 10 of more mature plants were taken. Samples were dried to constant weight at a temperature of 50 to 55° C., ground, and analyzed for *nitrogen, phosphorus, potassium, calcium and magnesium.*

Dry Matter Production

The amount of dry matter produced on the three soils varied considerably. On the Cecil



*Reprinted from "Agricultural News Letter" (Du Pont), January-February, 1944.

soil, approximately 9700 pounds of dry matter per acre were produced; while on the Tifton and Clarksville soils, 6100 and 5000 pounds per acre, respectively, were grown. More than 90 per cent of the total weight was produced in the latter half of the growing period on all soils.

Nutrients in Cotton Plants

The cotton that produced the largest amount of dry matter per acre also contained the largest quantity of plant nutrients (Fig. 1). The total amounts of the five nutrients absorbed were 538, 393, and 311 pounds per acre on the Cecil, Tifton, and Clarksville soils, respectively.

"The sum of the nitrogen, phosphoric acid, and potash was 315, 225, and 136 pounds, respectively, for these three soils," the bulletin says. "The fertilizer applied contained a total of 108 to 120 pounds of these constituents, which amounts represent only a part of that taken up." More than 80 per cent of the plant nutrients taken up was absorbed in the latter half of the growing period.

A More Detailed Study

On the Cecil sandy loam, samples of cotton plants were also taken at 15-day intervals. These results, showing the very slow rate of early growth and plant-food absorption, are reported in detail in Table I and Figures 2 and 3.

Only 1 per cent of the total plant food finally absorbed was taken up, and less than 1 per cent of the total dry matter was produced, during the first 30 days after planting. Only 10 per cent of the total dry matter was produced, and 14 per cent of the plant food was absorbed, during the 60 days following planting, which represented two-fifths of the entire growing period.

After 90 days following planting, absorption of plant food and production of dry matter were very rapid. Cotton plants produced 69 per cent of the total dry matter and absorbed 61 per cent of the total plant food during the 30-day period from 90 to 120 days after planting.

Much of the new growth and absorbed

(Continued on page 22)

TABLE I
DRY WEIGHT PRODUCED AND NUTRIENTS ABSORBED BY COTTON PLANTS DURING
FIRST 30 DAYS AND EACH SUCCESSIVE 15-DAY PERIOD OF GROWTH
(Cecil Sandy Loam, Average, 1939 and 1940)

Days after planting	Part Analyzed	Dry Wt. per Acre lbs.	Plant Nutrients Absorbed Per Acre					
			N lbs.	P ₂ O ₅ lbs.	K ₂ O lbs.	CaO lbs.	MgO lbs.	Total lbs.
30	Plants	15.20	.55	.10	.40	.86	.37	2.28
45	Plants	29.50	1.31	.29	.79	.68	.58	3.65
60	Plants	259.28	8.39	1.63	5.42	7.08	4.04	26.56
75	Plants	457.69	12.56	2.84	10.40	10.44	3.85	40.09
75	Squares and Bolls	38.72	1.33	.25	.77	.86	.44	3.65
75	Total	496.41	13.89	3.09	11.17	11.30	4.29	43.74
90	Plants	191.60	2.97	.95	16.41	1.58	—1.90	20.01
90	Squares and Bolls	89.57	2.95	.75	2.18	1.94	1.00	8.82
90	Total	281.17	5.92	1.70	18.59	3.52	— .90	28.83
105	Plants	2603.20	42.57	10.96	34.18	51.67	26.79	166.17
105	Squares and Bolls	1055.79	12.97	12.00	12.03	6.23	5.48	48.71
105	Total	3658.99	55.54	22.96	46.21	57.90	32.27	214.88
120	Plants	472.20	7.11	—2.74	26.54	6.27	37.18
120	Squares and Bolls	2603.56	29.98	17.10	18.09	13.95	12.61	91.73
120	Total	3075.76	37.09	14.36	18.09	40.49	18.88	128.91
135	Plants	—409.86	—16.28	1.49	3.52	11.47	—5.67	—5.47
135	Squares and Bolls	2807.01	26.35	19.14	23.31	12.75	13.96	95.51
135	Total	2397.15	10.07	20.63	26.83	24.22	8.29	90.04
150	Plants	—288.51	—1.87	—2.58	—6.00	—2.60	—5.69	—18.74
150	Squares and Bolls	—204.44	3.39	1.32	1.74	18.57	1.04	17.86
150	Total	—492.95	1.52	—3.90	—7.74	15.97	—6.73	— .88
	Total Plants	3330.30	57.31	12.94	65.12	107.72	28.64	271.73
	Total Squares and Bolls	6390.21	76.97	47.92	54.64	54.30	32.45	266.28
	Total	9720.51	134.28	60.86	119.76	162.02	61.09	538.01

Serious Shortage in Phosphorus

The War Production Board and the War Department was charged by the Tennessee Valley Authority with making a "grave error" in judgment of the probable need for phosphorus in the war program with the result that a "serious shortage" has developed in supplies of the material that is now attempted to be remedied by "makeshift methods," it was disclosed in hearings on the 1945 fiscal year appropriations for TVA made public January 26th by the house appropriations committee.

David Lillienthal, chairman of the TVA, told the committee that in June, 1942, he urged upon the War Production Board that it grant priority assistance for construction of a \$6,500,000 plant for production of elemental phosphorus at Chickasaw, Ala., warning at the time that it would take twelve months to get the plant into production, but the Authority's request was denied, with approval of the War Department, because existing plant capacity was sufficient to meet requirements as they were then known. Mr. Lillienthal said:

"We believe a grave error has been made in the action that refused priorities for the construction of that plant; for had they been granted at the time, the plant would now be operating, on the basis of Florida rock, virtually inexhaustible in supply and there would be the new plant operating at or about Mobile. It now appears there is a shortage of phosphorus, and a serious one, and make-shifts are being considered to try to meet that situation."

The "makeshift" now being resorted to to step up production of the material, he added, is the building of additional furnaces at existing TVA plants. He estimated the War Department's demand for elemental phosphorus for chemical warfare uses in the fiscal year 1945 from the TVA at 28,280 tons, which compares with 13,100 tons in fiscal 1944 and 12,342 tons actually shipped in fiscal 1943.

Mr. Lillienthal estimated other fertilizer material shipments in the fiscal year 1945, compared with 1944, as follows:

Concentrated superphosphate, 42,750 tons, against 47,750 tons; calcium metaphosphate, 14,000 tons, against 10,000 tons; dicalcium phosphate, 18,000 tons, against 13,300 tons; fused calcium phosphate, 33,000 tons, against 6,500 tons.

Mr. Lillienthal did not include a tonnage figure on fiscal 1945 distribution of the products of the ammonia and ammonium nitrate plants, but said that the material dis-

posed of to commercial fertilizer distributors will amount to \$5,390,000, the same as for fiscal 1944. None of the ammonium nitrate will be required by the War Department.

Decline in Winter Grain Crops Expected

The winter wheat crop for harvest in 1944, is indicated at 526,975,000 bushels, or about 3,000,000 bushels less than this past year, according to the December 1 Crop Report. Approximately 21.9 per cent of the acreage planted will not be harvested, and the total crop will be only 69 per cent of normal with indicated per acre yields of 11.2 bushels compared to 14 bushels in 1943. However, an increase in over 9,000,000 acres of wheat planted was obtained, while rye acreage is approximately one million less than a year ago.

New Maine Fertilizer Company Organized

J. E. Totman, President of Summers Fertilizer Co., Inc., Baltimore, Maryland, announces that Summers and its associates have organized the Northern Chemical Industries, Inc., a Maine corporation. The officers are: J. E. Totman, President; R. E. Fraser, Vice-President; W. H. Gabeler, Vice-President; W. A. Fessler, Secretary; N. K. Totman, Treasurer; F. P. Preti, Clerk.

Following approval by the Chemical Division of WPB, plans have been completed, contracts placed and erection started on a sulphuric acid and superphosphate plant at Searsport, Maine. The sulphuric unit will be a modern contact, Monsanto type, plant producing all grades of sulphuric acid. Contract for this unit has been awarded to the Leonard Construction Company of Chicago, Ill. The superphosphate and storage units will be erected by T. W. Cunningham, Inc. of Bangor, Maine. The Sturtevant Mill Company of Boston will supply the superphosphate and handling equipment. The rock grinding equipment will be a Raymond mill unit. The superphosphate plant will have an annual capacity of 75,000 tons. The buildings housing the superphosphate and rock storage will embody the laminated wooden arched type construction providing large unobstructed areas for handling bulk material. Production is expected to commence about July 1, 1944.

The location is adjacent to Summers' mixed fertilizer factory at Kidders Point, Searsport, Maine, on the Bangor and Aroostook Railroad. Deep water shipping facilities are also alongside.

This plant will serve Northern New England and the Maritime Provinces. It is the only complete contact acid, superphosphate and mixed fertilizer manufacturing unit in the Northeastern area.

The development of the project is under the direction of William H. Gabeler, who has been associated for many years with the fertilizer and sulphuric acid industries. He has worked out, in the design, a remarkable balance of economical chemical units. R. E. Fraser, also a Vice-President of both companies, will be Resident Manager with headquarters at Bangor, Maine; J. G. Moynihan, Assistant Manager; and W. B. Bird, General Superintendent. The project fills a long recognized need for such facilities in this area.

Fertilizing Hemp

Several states tried out a method of placing fertilizer on the plow sole in 1943, and in Wisconsin five demonstration plots were set up on corn and one on hemp.

The fields selected varied greatly in fertility levels, some being very low and some very high. In each case a strip running the entire length of the field was fertilized. Later, at planting time, an additional treatment of "starter" fertilizer was used on half of the strip receiving the plow sole treatment, in order that the two plots might be compared with each other as well as with the parts of the field receiving no treatment.

It was found that on all the plots where "starter" fertilizer was used both corn and hemp made a vigorous start, and as a result it is highly recommended that starter be used in addition to the plow sole treatment.

Hemp responded in a very spectacular manner to the plow sole treatment. The Louis Rauls farm in Dane Co., was selected as the demonstration plot, and a field that was low in fertility was selected. It had not had an application of manure in 1943 and had grown a good corn crop in 1942.

The strip was treated with 10-10-10 applied on the plow sole. The hemp came fast, was uniformly dark green in color, and average height was 8 feet. The hemp on the unfertilized part of the field was yellow, weedy, sick-looking and small, averaging only 2 feet in height. Hemp from the plow sole plot scored No. 1 grade, and from the rest of the

field No. 4 grade. The difference in price between the two grades of hemp and the weight difference showed that after all costs of the fertilizer and treatment had been deducted there was still a net profit of \$151.92 per acre. The cost of the fertilizer treatment amounted to \$18.83 an acre, but the yield was 8194 pounds of No. 1 hemp as compared with a yield of 1344 pounds of No. 4 hemp on the unfertilized plot. This should make hemp history in 1944!

December Sulphate of Ammonia

The production of by-product sulphate of ammonia during December, 1943, totaled 66,154 tons, an increase of 8.6 per cent over November, according to the figures of the U. S. Bureau of Mines. This brings the figures for the year to a grand total of 762,645 tons produced during 1943, compared with 766,804 tons during 1942. Sales during 1943 amounted to 774,834 tons, valued at \$20,240,553. At the end of the year, stocks on hand were 29,431 tons.

Ammonia liquor production continues at the established levels. December, 1943, output was 2,903 tons NH_3 content, while the total for the year came to 34,094 tons.

December Figures

	Sulphate of Ammonia Tons	Ammonia Liquor Tons NH_3
Production		
December, 1943.....	66,159	2,903
November, 1943.....	60,927	2,744
December, 1942.....	63,812	2,869
Sales		
December, 1943.....	70,352	2,969
November, 1943.....	72,528	2,912
December, 1942.....	69,740	3,000
Stocks on hand		
December 31, 1943.....	29,431	991
November 30, 1943.....	33,705	939
December 31, 1942.....	43,676	1,016

Production During 1943

	Sulphate of Ammonia Tons	Ammonia Liquor Tons NH_3
January.....	64,116	2,902
February.....	59,132	2,591
March.....	65,794	2,868
April.....	63,840	2,871
May.....	64,401	2,927
June.....	60,144	2,794
July.....	62,257	2,878
August.....	65,486	2,899
September.....	65,073	2,802
October.....	65,321	2,915
November.....	60,927	2,744
December.....	66,154	2,903
	762,645	34,094

THE AMERICAN FERTILIZER

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INDUSTRY AND ITS ALLIED INDUSTRIES

PIONEER JOURNAL OF THE FERTILIZER INDUSTRY

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A. A. WARE, EDITOR

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Commodity Credit Corporation to Handle Ammonium Nitrate Distribution

Distribution of ammonium nitrate being produced by the Army Ordnance plants for use in the manufacture of fertilizer has been placed in the hands of the Commodity Credit Corporation under an arrangement mutually agreed upon by the War Production Board and the War Food Administration. Commodity Credit Corporation in turn has awarded the contract to Associated Cooperatives, Inc., to act as its agent in the distribution of the material. Ashcraft Wilkinson Company will continue to act as the distributing agent for the ammonium nitrate imported from Canada.

The new arrangement goes into effect February 1st and supersedes the present arrangement that has been in effect since November 1st under which the Tennessee Valley Authority acted as the distributor for the Army Ordnance material. All details concerning the operation of the program had not been completed by the CCC up to January 20th, but officials said that they hoped to be able to make an announcement within a few days.

The primary difficulty in the distribution program, as it has been followed, has been the variances in delivery prices to dealers and manufacturers growing out of the fact that the material is sold by the Army on an f. o. b. basis. Manufacturers and dealers have been unable to estimate the cost of the material to them until delivery is made since transportation charges had to be added to the costs from whatever point of production the material happened to come from.

Officials are now studying the desirability of adopting one of two pricing arrangements or a combination of both as a solution of this problem—establishment of price zones within which the delivered charge would be the same to all buyers within the area, or establishment of a basing point system of computing delivered prices.

Actual handling of the mechanics of distribution will be in the hands of Associated Cooperatives, Inc., it is understood, and the Commodity Credit Corporation will only enter the picture to cover any losses that may occur in the program. The length of time that this arrangement will continue, however, depends largely upon the action that Congress takes on the legislation now pending to extend the life of the CCC. The organization is due

to go out of existence February 15th, unless extended by Congress. Furthermore, it is questionable at this time whether the corporation will be allowed to continue its subsidy program even if its life is extended. Sentiment is running strongly against the subsidy programs.

Record Imports of Chilean Nitrate

In the war years 1941-42 and 1942-43, about 1,600,000 tons of Chilean nitrate of soda were brought into the United States, with a loss by enemy action of only two cargoes, totaling 12,000 tons, according to a report published by the Chilean Nitrate Sales Corporation. This is the largest amount imported for many years.

The report states that, whereas, in the first World War, Chilean nitrate was used largely in the manufacture of munitions, in this war the great bulk of the supply has been devoted to its most natural and valuable use, the production of food and feed. For the current year ending June 30, 1944, negotiations have been concluded for the purchase of 700,000 tons of Chilean nitrate, with a 60-day option for the purchase of an additional 300,000 tons.

Pointing out that the nitrate industry in Chile is a large buyer of American products, J. A. Woods, president of the corporation, states that it spent an average of over \$350,000 a month in the United States during these two years for its essential supplies, such as machinery, spare parts and raw materials. Approximately 75 per cent of the world's iodine comes as a by-product from Chilean nitrate.

Increased Potash Allocations in Third Quarter

A material improvement has occurred in the potash picture over what it was at the beginning of the second quarter, which will make possible increased allotments of potash for fertilizer use in the third period, according to information submitted to members of the Fertilizer Industry Advisory Committee.

The improvement stems from two important developments:—First, a 50 per cent reduction in Lend-Lease requirements, and, second, increased production by domestic producers above what had been expected. The supply of the material for fertilizer use, it was learned, amounts to almost 103 per cent

of the base period consumption, 1941-42 and 1942-43, which compares with about 90 per cent at the start of the second quarter.

Approximately 60,000 tons of potash, equal to about 36,000 tons K_2O , had been set aside for Lend-Lease, chiefly to meet the requirements of England. Only 30,000 tons have been shipped, however, and the rest was being withheld pending efforts of the British to obtain its supplies elsewhere.

While no information was immediately available as to whether Britain had obtained its needs from other sources, it was revealed that the remaining 30,000-ton allotment, equal to 18,000 tons K_2O , is to be added to the supply available for domestic fertilizer needs.

Figures on domestic production of potash were not disclosed, but it was said that the plants were breaking all records and exceeding the rated capacity estimated by the engineers.

Ammonium Nitrate Prices Fixed for February and March

The price of Ordnance-produced ammonium nitrate to be distributed by Associated Cooperatives, Inc., acting as agent for Commodity Credit Corporation in the handling of this material, has been fixed at \$50 a ton, f. o. b. nearest production point, to fertilizer manufacturers and mixers for February and March.

The new pricing arrangement replaces that which has been in effect since November 1st when the Tennessee Valley Authority took over the handling of distribution of the material. The price under the TVA program, which expires with the close of January, was \$49 a ton, f. o. b. point of production, which resulted in extreme hardships being imposed upon the buyers far removed from the production plant from which they happened to get their supply.

In effect it is now proposed to go over to a basing point system of pricing which will permit all manufacturers and dealers within a given area being treated alike. Regardless of where the ammonium nitrate happened to be produced and shipped from, the price will be \$50 a ton plus freight charges from the nearest plant.

The \$50 price, it was explained by officials, is firm for February and no change is expected to be made for March shipments. They could make no commitment beyond March, however.

Ammonium Nitrate as a Fertilizer for Georgia Soils

By L. C. OLSEN

Georgia Agricultural Experiment Station,
Experiment, Ga.

During 1944 a large amount of ammonium nitrate will be available for fertilizer purposes in Georgia. Inquiries received at this Station have been concerned chiefly with the merits of this material as a side-dressing or when used at planting as compared with nitrate of soda or some of the other more widely used forms of nitrogen.

Results of an experiment conducted with corn grown on Cecil sandy loam in Spalding County on the use of ammonium nitrate as a side-dressing indicate that this material is equally as good as nitrate of soda for this purpose. Only 13.8 bushels of corn per acre were obtained where no nitrogen was used as a side-dressing while 21.8 bushels per acre were obtained on the plot receiving 150 pounds of nitrate of soda (24 lbs. N) per acre and 21.6 bushels on the plot receiving 71 pounds (24 lbs. N) per acre of ammonium nitrate which analyzed 34 per cent nitrogen. In other words, equivalent amounts of nitrogen from the two sources produced almost identical yields. Corn yields were low in general in Spalding County this year because of a poor distribution of rainfall during the growing season.

Tests conducted at this Station with ammonium nitrate compared with other sources of nitrogen for cotton show that, when lime is used, ammonium nitrate is as good as neutral forms of nitrogen fertilizer. Although ammonium nitrate is not as acid-forming as certain other forms of nitrogen fertilizer, 61 pounds of ground limestone are required to

neutralize the acidity in 100 pounds of ammonium nitrate. The use of ammonium nitrate without lime on some soils in Georgia even for a short time may result in decreased yields of cotton as well as some other crops. On soils which have recently had broadcast applications of lime or where the ammonium nitrate is neutralized with lime at the time of application, excellent results may be expected from its use.

In using the 34 per cent ammonium nitrate as a top-dressing for small grain, difficulty may be experienced in obtaining an even distribution when only 75 to 100 pounds per acre are used. Other factors which will make uniform distribution more difficult are the unfavorable particle size and the greater cohesion of the ammonium nitrate crystals as compared with nitrate of soda. These difficulties may be largely overcome by cutting the concentrated ammonium nitrate fertilizer down to 17 per cent by mixing it with equal parts by weight of dry, finely-screened soil, sand, or limestone. Hydrated or burnt lime must not be mixed with ammonium nitrate. If these more active forms of lime are mixed with ammonium nitrate, a chemical reaction takes place which results in the loss of ammonia. The ammonium nitrate distributed last spring caked very badly in the bag. This difficulty has been largely overcome in the process of manufacture by adding a small amount of inert material to the ammonium nitrate.

Cal-Nitro is ammonium nitrate combined with limestone. In this form there is no danger of increasing the acidity of the soil and Cal-Nitro can be handled very easily. In conclusion, it may be said that the present forms of ammonium nitrate fertilizer are slightly more difficult to use as a top-dressing or side-dressing than nitrate of soda, and on some soils ammonium nitrate may produce poor results unless lime is also used.

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FERTILIZER MATERIALS MARKET

NEW YORK

Farmers Buying Mixed Fertilizers Much Earlier Than Usual. Marketing of Ammonium Nitrate from Army Ordnance Arranged. Cottonseed Meal Allocated for Tobacco Fertilizers.

Exclusive Correspondence to "The American Fertilizer"

NEW YORK, January 25, 1944.

Mixed fertilizers have been moving to consumer trade and some of the larger companies report that up to this time they have moved twice as much as normally. This is very fortunate as, due to the labor shortage, it would be impossible to reach the peak of deliveries which could be attained in normal times.

Sulphate of Ammonia

The demand continues active and deliveries are continuing normally.

Ammonium Nitrate

Washington has arranged for the distribution of the Ordnance Nitrate, which, it is understood, will be marketed subject to approval of orders by Washington, the Ordnance material not going into the trade until all the Canadian material and TVA material is disposed of. CCC is the intermediary between the Army Ordnance and final distributor of the material to the trade.

Potash

It is expected that the allocations for the third period will be forthcoming shortly and buyers will surely place their orders without delay, as there seems to be no surplus of this material in any of the fertilizer plants.

Superphosphate

Production of this material continues satisfactory but buyers are taking delivery so that stocks are not being built up.

Cottonseed Meal

The authorities in Washington have recognized the need of this material by the tobacco growers, especially in Connecticut, and allocations of recent arrivals have been made to fertilizer manufacturers for use in tobacco fertilizer.

Nitrogenous Material

All manufacturers are completely sold up, with deliveries considerably behind schedule due to the labor situation.

BALTIMORE

Shortage of Labor for Spring Mixing Season Threatens. Little Change in Materials Situation. Burlap Fertilizer Bags Permitted.

Exclusive Correspondence to "The American Fertilizer"

BALTIMORE, January 25, 1944.

The market on fertilizer materials has been more or less routine during the past two weeks without any outstanding features. Manufacturers are now preparing for the spring season, and indications point to a possible labor shortage as they are all experiencing difficulty in securing ample workmen to run at capacity.

Ammoniates.—The entire production of tankage and blood is now going into the manufacture of feeding material of which there is an acute shortage, and these articles are out of the running as fertilizer materials.

Castor Pomace.—Producers are sold up for this month and next, and not taking on any further business.

Sulphate of Ammonia.—There are no re-sale offerings on the market, and all fertilizer manufacturers are endeavoring to secure utmost tonnage under allocation in preference to deriving their mineral source from ammonium nitrate.

Nitrate of Soda.—Deliveries are still being made under allocation, and manufacturers are compelled to use a portion of tonnage allotted to them in their mixed goods.

Superphosphate.—The market remains firm at ceiling price of 64 cents per unit of A. P. A. for run-of-pile, f. o. b. producers' works, Baltimore, in bulk, per ton of 2,000 lb.

Potash.—No change in the situation, and manufacturers are now securing supplies of this material against contracts booked some time ago. No re-sales obtainable.

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Bone Meal.—Up to the present time there have been no offerings on the market of the South American product, although the shipping situation is reported to be easing up, and before long it is expected that South America will again be source of supply.

Bags.—The burlap situation is still critical, but the War Production Board has made exceptions and granted authority to fertilizer manufacturers under certain conditions to use new burlap bags. There are no heavy shipments enroute from India due not so much to the shipping situation but rather to unsettled conditions in India making accessible supply more difficult to secure for export to the United States.

CHARLESTON

Mixed Goods Shipments Improving. Shortage of Organics Increases. Surplus of Castor Oil Hampers Castor Meal Output.

Exclusive Correspondence to "The American Fertilizer"

CHARLESTON, January 24, 1944.

The movement of mixed goods has picked up considerably within the past week or ten days.

Organics.—There has been no improvement in the expected supply of processed tankage, and some authorities believe that the shortage of organics for fertilizers will amount to 35 to 40 per cent. So much of the supply of some organics has gone into the feed trade.

Castor Meal.—To complicate the situation on this material, it has recently developed that some mills have had to curtail crushing as storage could not be found for castor oil, and until this situation is relieved they could not continue crushing.

Cottonseed Meal.—Prices for the 8 per cent grade are as follows: Atlanta, \$49.50; Memphis, \$48.50; South Carolina, \$50.00.

PHILADELPHIA

Large Tonnage of Mixed Fertilizers Indicated by Demand for Conditioners. Allocation Ton-nages of Materials Being Met by Producers.

Exclusive Correspondence to "The American Fertilizer"

PHILADELPHIA, January 24, 1944.

A reflection as to the great tonnage of mixed fertilizer being produced is noted in the demand for the lower-analysis ammoniates, for use as conditioners. Like everything else, even these are scarce nowadays. Only one or two items in this line are available, and then only in limited quantities.

It was noted with interest that some cottonseed meal (although a comparatively small quantity) has been released for use in fertilizers. However, it is hoped that this will lead to additional releases.

Ammoniates.—The chemical materials are chiefly under allocation, as is well known, and while mixers are limited to a certain amount of the organic nitrogenous materials, yet the demand keeps up.

Sulphate of Ammonia.—Production rate holding well, and material continues under allocation.

Nitrate of Soda.—Demand good, and apparently allocations are being met.

Superphosphate.—Demand keeps up, and while apparently producers are having to struggle, yet they keep up the supply.

Bone Meal.—Still rather tight, and little fertilizer grade is reported around.

Potash.—Mixers could apparently use additional, if they were permitted to under allocations. However, producers are hard put to maintain present rate of production.

Castor Pomace.—Demand is good, and while heavy importations of beans have been noted in import manifests, yet this has not helped the supply situation, due to the fact that these beans are not being crushed, owing to the large stocks of castor oil now on hand.

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CHICAGO

Fertilizer Organics Market Unchanged with Supplies Low. Feed Market Continues Active with Supplies Allocated.

Exclusive Correspondence to "The American Fertilizer"

CHICAGO, January 24, 1944.

The organic market remains unchanged. Scattered trading took place, but only on allotment basis. Labor situation is slightly improved but stocks, according to sellers, are not accumulating sufficiently.

Demand for feed continues active, and while tankage production has been heavy, orders for finished feed exceed the output. The needs of consumers are therefore being allocated as thinly as possible.

Ceilings in both departments are well maintained.

High grade ground fertilizer tankage, \$3.85 to \$4.00 (\$4.68 to \$4.86 per unit N) and 10 cents; standard grades crushed feeding tankage, \$5.53 per unit ammonia (\$6.72 per unit N); blood, \$5.38 (\$6.54 per unit N); dry rendered tankage, \$1.21 per unit of protein, Chicago basis.

TENNESSEE PHOSPHATE

Use of War Prisoners Urged to Solve Labor Shortage. Law Proposed to Compel Filling of Mined Phosphate Pits.

Exclusive Correspondence to "The American Fertilizer"

COLUMBIA, TENN., January 24, 1944.

Shipments for January so far have kept full pace in all consuming channels with the great activity noted in December, the only limitation being manpower supply to permit full use of all machine capacity installed, which has not been available here for some time. While nothing of the kind has as yet been done, it is a matter of serious consideration among the large operators as to whether it would be possible to establish a branch camp in this area to enable them to secure war prisoners from some of the Tennessee camps, for the

character of labor it is permissible for these prisoners to perform. Track and road labor and some classes of loading would be about the only places they could be used, as they are not permitted to work about machines or in work of any hazardous nature. Relief from that standpoint, however, would release some of the present labor for other tasks.

In some places AAA authorities are giving opportunity to farmers, who were prevented from getting shipment of phosphate before December 31st through no fault of their own, to get their benefit payment credits for rock applied during January, but for the most part this is being denied, thus working undeserved hardship on some.

The activity in the way of taking options on phosphate properties continues to increase. Several of the interests already located here are more active in investigation of properties. This, of course, is a regular operation with all of them to some degree, for maintenance of reserve supply, but any advent of outside interest always increases local activity.

Recent newspaper publicity is being given to the often agitated question of forcing, by legislative action, the restoration of the land surface after mining to state suitable for farming.

This matter was before the last session of the legislature in a bill to compel all owners of property from which any strip mining or quarrying had been done, to at once restore the surface to condition suitable for agricultural operations, but it was killed in committee, when it was realized that this covered all clay pits, coal mines, limestone quarries, sand and gravel pits as well as the phosphate mines, which seem to be the main objective. Now the legislation is to be confined to phosphate mines alone, and one of the leading papers of the state keeps at its masthead, as one of its objectives, "*Fill the Phosphate Cuts.*"



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The largest operating companies would be very adversely affected by such a law and many of them would be forced to discontinue operations by reason of the very low margin permitted by the ceiling prices as, of course, the complete restoration of surface could only be accomplished at a cost varying from 15 to 50 cents per ton of phosphate recovered. The best and most economically minable deposits would have the lowest cost of restoration and vice versa. However, the real burden would fall on owners of phosphate land on which mining was done to limited extent from thirty to fifty years ago and discontinued because of discovery of higher grade and more economically minable deposits. More than one hundred thousand acres of such lands are now in possession of independent owners, mostly farmers, some investors waiting their chance to dispose of them to operators when they are ready to use them. As the cost of restoration of these lands would in many cases exceed the entire price being asked for them, it can easily be seen that any such action by law would play into hands of purchasers at forced sales. No one who knows the business would refill such lands as all must be re-mined. In many places lands have been restored and cultivated many years after the first mining and have been again torn up worse than before.

Soil Conservation Service Annual Report

More than a third of America's 6,000,000 farms have been enrolled by their operators in the national soil conservation program, which attained its tenth anniversary this year, according to the annual report of the Soil Conservation Service, recently submitted to War Food Administrator Marvin Jones and released by the Department of Agriculture. Two and a half million farms are now within the nearly 1000 farmer-organized and farmer-directed soil conservation districts in 45 states.

The work of these districts, including 553,000,000 acres of farmland, has contributed substantially to the record food and fiber production of the last two years, said Dr. H. H. Bennett, chief of the Service, in recounting the progress made by the conservation agency.

The report points out that yields of corn, soybeans, wheat and other critical war crops have increased an average of 20 per cent on 54,000,000 acres of completely treated farmland. This expansion in productive capacity in most cases was obtained, the report said, without additional cost in labor or materials.

Production on another 63,000,000 acres was also increased through the program of simplified soil conservation techniques such as contouring and strip-cropping. This program, the report said, was an adaptation of the agency's long-range program in order to help U. S. farmers meet the war crop production goals.

Stabilization of the nation's topsoil has been achieved on 10 per cent of the farmland. The plow-up of millions of acres of unsuitable soil during World War I which led to the "Dust-bowl" era, is not likely to be repeated on an extensive scale, the Soil Conservation Service says, because "there is no indication" that farmers in the area "will ever forget the difficulties experienced in restoring these seemingly doomed lands to security and productivity."

The report recounts progress in research and application of conservation techniques adjusted to different types of soil, climate, and cropping and grazing patterns in various regions of the country. The practice of stubble mulching or the preservation of crop residues as a surface cover, it is pointed out, has proved effective in protecting soil from wind erosion and drought hazard, particularly in the grain-producing states.

Proper land-use in the future, the report states, will bring about the permanent retirement of some land now used for crops but unsuited to further cultivation. Other millions of acres, however, will be improved and made arable largely through long-range drainage and irrigation projects. The Service has already increased productivity of, or brought into production (by drainage with CCC labor) a total of 12,000,000 acres of farm lands.

By the end of the 1943 fiscal year, the Service reported, complete conservation plans for another 44,000,000 acres of farmland had been prepared, providing a blueprint for rapid extension of soil stabilization.

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Phosphate Fertilizer Plant for Idaho

J. R. Simplot, of Caldwell, Idaho, has been authorized by the War Production Board to purchase the necessary equipment and machinery for a phosphate fertilizer processing plant to be erected at Pocatello, Idaho, at a cost of \$499,758, it was announced recently by Senator John Thomas of Idaho.

International Increases Defense Plant Operations

International Minerals & Chemical Corporation, Chicago, Ill., has increased its contract with the Defense Plant Corporation, to provide additional facilities at plants in Carlsbad, N. M., and Austin, Tex., at a cost of approximately \$175,000, resulting in an overall commitment of approximately \$18,850,000. International Minerals & Chemical will operate these facilities, title remaining in Defense Plant Corporation.

RATE OF PLANT FOOD ABSORPTION BY COTTON

(Continued from page 9)

plant food were found in the bolls. The major portions of the total nitrogen, phosphorus, and magnesium were in the squares and bolls with 78 per cent of the phosphorus in the fruiting parts of the plant. Most of the calcium and potassium were in the stems and leaves.

Summary

Absorption of nutrients and production of dry matter were very slow during seedling stage. During the seedling-to-early-square period, rates of absorption of plant food and of growth were increased, but were still slow. Very rapid absorption and growth occurred at time of boll formation. On the Cecil sandy loam the most active period was the 30-day interval beginning 90 days after planting.

"The amount of nutrients found in the cotton plant was greater than the amount ordinarily added in fertilizer mixtures, indicating the important part plant residues may play in maintaining the fertility of soils devoted to cotton production," the bulletin says. "Approximations for the average amount of nutrients found in the mature plants, per acre, for all three soils are as follows: nitrogen, 104 pounds; P_2O_5 , 38 pounds; K_2O , 97 pounds; CaO , 132 pounds; and MgO , 43 pounds. It is interesting to note that nitrogen, potash, and calcium are found in quantities almost three times as great as the amounts in which phosphorus and magnesium are found."

INDUSTRY ADVISORY COMMITTEE DISCUSSES CURRENT PROBLEMS

(Continued from page 7)

otherwise the production cannot be accomplished. Mr. Aitken, AAA, stated that AAA cannot make plans for distribution of this May and June production without definite commitments from manufacturers as to the tonnage they will supply, and that AAA should have such commitments by the first of March. Members of the Committee concurred in this point of view but pointed out that manufacturers were deterred from making commitments because of uncertainty as to supplies of acid and phosphate rock they will be able to get. The subcommittee's report was approved by the Committee.

Mixed Fertilizers

The subcommittee reported an increase of supplies in potash, due to increased production and some potash turned back from supplies previously allocated to Great Britain, and recommended that fertilizer manufacturers re-study their allocations and production programs with a view to using all the potash available. It was suggested that, where practical, a supply of ammoniated base might be cured ahead so that whatever potash becomes available at the end of the season can

ALEX. M. McIVER & SON

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MILORGANITE

Specializing

Nitrogenous Materials

Blood and Fertilizer Tankage

Phosphate Rock

Bone Meals

Manganese Sulphate

**SOUTH AMERICAN DRY
RENDERED TANKAGE**

PEOPLES OFFICE BUILDING

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Specializing in

Sulphate of Ammonia
Low Grade Ammoniates

Superphosphate
Sulphuric Acid

Bags

*Inquiries and offerings
invited*

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Fertilizer plants all over the country—large and small—state their needs and we meet them. Large stocks of seasoned materials and ample modern production facilities enable us to make prompt shipments.

TRIPLE SUPERPHOSPHATE

46 to 48% Available Phosphoric Acid

We also manufacture

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... WHEN BORON IS NEEDED TO CORRECT A DEFICIENCY OF THIS IMPORTANT SECONDARY ELEMENT

Agricultural authorities have shown that a lack of Boron in the soil can result in deficiency diseases which seriously impair the yield and quality of crops.

When Boron deficiencies are found, follow the recommendations of local County Agents or State Experiment Stations.

Information and references available on request.

AMERICAN POTASH & CHEMICAL CORPORATION

122 East 42nd ST., NEW YORK CITY

Pioneer Producers of Muriate of Potash in America

See Page 4



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still be mixed and shipped. The majority of the manufacturers present at the subcommittee meeting felt that all the mixed fertilizer the industry can produce this season can be sold and that all the potash available will be used and distributed. It was recommended that the Committee suggest to WPB that any allocations of potash made for a given month and not taken up within a reasonable time, say by the 10th of the month, be reallocated to other companies. Upon a report that restrictions on the use of 10-6-4 in Virginia has resulted in a large increase in sales of 7-7-7 and consequent increase in use of potash in mixing, it was recommended that restrictions on the use of 10-6-4 in Virginia be removed, subject to Dr. Zimmerley's request.

A number of persons reported that labor problems were becoming difficult. Some plants have appealed to farmers to come in and work for a few weeks during the slack winter season with the promise that those who did so would be guaranteed a supply of fertilizer.

In response to WFA request that estimates be prepared of the requirements for fertilizer in 1944-45, a number of such estimates were presented to the subcommittee. They varied around 700,000 tons of nitrogen (N), 1,250,000 tons of phosphoric acid (P_2O_5), and 700,000 tons of potash (K_2O). The report was approved by the Committee and accepted by WFA, with the understanding, after discussion, that the restrictions on the use of 10-6-4 in Virginia will be removed if such action represents the view of the agronomists and a majority of the industry in the affected area.

The public relations task group reported that there have been good results from the educational work carried on by various agencies, in and out of Government, for the early movement of fertilizer.

Transportation

For carrying out the transportation conservation program as discussed at the December 9th meeting of the Committee to help alleviate the burden which rests so heavily upon our system of transportation and upon the national supply of gasoline and rubber, the subcommittee made certain suggestions and recommendations:

(1) That the number of fertilizer company representatives who are to be engaged in the

program, and who are to obtain a supplementary gasoline ration for that purpose, pursuant to the WFA letter of January 10th to all fertilizer manufacturers, be restricted to not in excess of 1,500.

(2) That the supplementary gasoline ration to each applicant over and above his allowed "A" and "B" ration be not in excess of 4,500 miles for the period ending May 30, 1944.

(3) That all applications for this supplementary gasoline reach WFA for certification on or before March 1, 1944, and that WFA begin certification of these applications as soon as possible.

(4) That WFA send a letter to all fertilizer manufacturers notifying them that the maximum of 4,500 miles for an applicant will be certified only when extreme need is shown; that where no additional gasoline is needed by an applicant for the furtherance of this transportation conservation program no application be made; and that any abuse of the application would certainly draw criticism and may cause a retraction of the privilege.

(5) That it will be necessary in cases where misunderstandings or errors occur, to withhold certification in full or in part until such misunderstandings are clarified.

(6) That the following steps be taken: (a) transfer as much fertilizer tonnage as practical from extravagant truck hauls to rail movement; (b) load railroad cars as much above minimum capacity as possible for safe handling; (c) reduce truck deliveries from fertilizer plants to a minimum where the truck is loaded only one way.

(7) That publicity be given to this transportation conservation effort by the same methods and with the same intensity as was used in the campaign for "Early Movement of Fertilizers."

(8) That every fertilizer manufacturer has the responsibility of helping carry out the recommended transportation adjustments by using all of his organization facilities, such as field representatives, shipping clerks, agents, dealers, and all other members of his personnel. Some suggestions: (a) Field representatives can explain to agents and distributors the purpose of the program and the necessity for cooperating; (b) all personnel can

L.W. HUBER COMPANY
Brokers Fertilizer Materials
—Room 903—
170 BROADWAY
NEW YORK 7, N.Y.



Seven things you should do:

1. Buy only what you really need	2. Pay no more than ceiling prices...buy rationed goods <u>only</u> with stamps	3. Pay off old debts and avoid making new ones	4. Support higher taxes...pay them willingly	5. Provide for the future with adequate life insurance and savings	6. Don't ask more money for goods you sell or work you do	7. Buy all the War Bonds you can afford - and keep them
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Keep prices down...use it up, wear it out, make it do, or do without

This advertisement, prepared by the War Advertising Council, is contributed by this magazine in cooperation with the Magazine Publishers of America.

suggest to agents and distributors that they use the services of truckers in their vicinity who are already hauling to or beyond the location of fertilizer plants; (c) order clerks may ask for greater tonnage in freight cars; (d) order clerks and shipping clerks may ask if trucks came loaded on the trip to factory; (e) use ODT letter by Director Joseph B. Eastman, with special emphasis on the part of this letter relating to those things that should be done and those things that should not be done. The report was approved by the Committee and accepted by WFA.

Compliance Problems with Respect to FPO 5, Revision 2

Mr. Derrick reported that excellent results, particularly as to food production, had followed last year from observance of the provisions of FPO 5. The order was simplified for this year. Manufacturers are observing the restrictions as to grade production. Practically all of them are complying also with the provisions as to application forms and are co-operating with WFA by submitting, as requested, samples of the particular forms they expect to use. He expressed confidence that the provisions of the order will be observed, but suggestions would be welcomed as to what course should be followed if there should be any complaints of serious violations. Perhaps WFA should, from time to time, send short statements to manufacturers, to remind them of their responsibilities under the order. Serious violations, if they tend to impair attainment of crop production goals, may give rise to more severe restrictions. Any complaint by a consumer as to wilful violation would be most unfortunate. The scope of future orders will depend largely on the degree of compliance with the provisions of the present order. It is incumbent on the industry to demonstrate that it can do a good job with a minimum of compulsion.

Paper Bags

WPB reported that the fertilizer industry was the largest consumer of paper shipping bags in 1943, and requested information as to future requirements of such bags. WFA stated that arrangements would be made to supply such estimates.

C. L. Neill, chairman of AAA Committee in Mississippi, was introduced to the Committee. He stated that he was in Washington, as the representative of a conference recently held at Little Rock, in the interest of increased production of forage crops and pastures as a means of increasing the food supply. For this purpose he thought there was need for 3,000,000 more tons of superphosphate and appealed for a program to get this material.

Resources Subcommittee

The following were appointed as a subcommittee to study the question of the resources and facilities of the fertilizer industry in relation to requirements for fertilizer: M. H. Lockwood, chairman, H. M. Albright, Ralph B. Douglass, Sidney B. Haskell, J. A. Miller, R. W. McClellan, George E. Pettit, John E. Sanford, and J. A. Woods.

Fertilizer for Sugarcane

For fertilizing sugarcane in Mississippi, where the old 4-8-4 is no longer used, about 240 to 400 pounds of 5-10-5 per acre are recommended for use on each side of the row in the barred off furrows in early spring. When the plants have reached a height of from 8 to 12 inches, this should be followed by a side dressing of 300 to 500 pounds per acre in June. Where sugarcane is planted in the spring, as in the central part of the State, the first application of fertilizer may be applied in the row, suggests *Mississippi Farm Research* for November, 1943.

• SOUTHERN PHOSPHATE CORPORATION •		
Miners of FLORIDA LAND PEBBLE PHOSPHATE ROCK <i>~all commercial grades!</i> Plants at Sangully, Pauway, Medulla and Ridgewood, Fla.		
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No mathematical calculations are necessary. You can find the figures in a few seconds with the aid of

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To make clearer its use, answers to such problems as the following can be quickly obtained:

How much sulphate of ammonia, containing 20 per cent. of nitrogen, would be needed to give $4\frac{1}{2}$ per cent. nitrogen in the finished product?

Seven hundred and fifty pounds of tankage, containing 8 per cent. phosphoric acid are being used in a mixture. What per cent. of phosphoric acid will this supply in the finished goods?

Should the Adams' Formula Rule become soiled from handling, it may be readily cleaned with a damp cloth.

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This list contains representative concerns in the Commercial Fertilizer Industry, including fertilizer manufacturers, machinery and equipment manufacturers, dealers in and manufacturers of commercial fertilizer materials and supplies, brokers, chemists, etc. For Alphabetical List of Advertisers, see page 33.



ACID BRICK

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Chemical Construction Corp., New York City.

ACID EGGS

Chemical Construction Corp., New York City.

ACIDULATING UNITS

Chemical Construction Corp., New York City.
Sackett & Sons Co., The A. J., Baltimore, Md.

AMMO-PIIOS

American Cyanamid Co., New York City.

AMMONIA—Anhydrous

Barrett Division, The, Allied Chemical & Dye Corp., New York City.
DuPont de Nemours & Co., E. I., Wilmington, Del.
Hydrocarbon Products Co., New York City.

AMMONIA LIQUOR

Barrett Division, The, Allied Chemical & Dye Corp., New York City.
DuPont de Nemours & Co., E. I., Wilmington, Del.
Hydrocarbon Products Co., New York City.

AMMONIA OXIDATION UNITS

Chemical Construction Corp., New York City.

AMMONIATING EQUIPMENT

Sackett & Sons Co., The A. J., Baltimore, Md.

AMMONIUM NITRATE SOLUTIONS

Barrett Division, The, Allied Chemical & Dye Corp., New York City.

AUTOMATIC ELEVATOR TAKEUPS

Sackett & Sons Co., The A. J., Baltimore, Md.

BARBITT

Sackett & Sons Co., The A. J., Baltimore, Md.

BAGS AND BAGGING—Manufacturers

Bagpak, Inc., New York City.
Bemis Bro. Bag Co., St. Louis, Mo.
St. Regis Paper Co., New York City.
Textile Bag Mfrs. Association, Chicago, Ill.
Union Bag & Paper Corporation, New York City.

BAGS—Cotton

Bemis Bro. Bag Co., St. Louis, Mo.
Textile Bag Mfrs. Association, Chicago, Ill.

BAGS—Paper

Bagpak, Inc., New York City
Bemis Bro. Bag Co., St. Louis, Mo.
St. Regis Paper Co., New York City.
Union Bag & Paper Corporation, New York City.

BAGS (Waterproof)—Manufacturers

Bemis Bro. Bag Co., St. Louis, Mo.
St. Regis Paper Co., New York City.
Textile Bag Mfrs. Association, Chicago, Ill.
Union Bag & Paper Corporation, New York City.

BAGS—Dealers and Brokers

Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Wellmann, William E., Baltimore, Md.

BAG CLOSING MACHINES

Bagpak Inc., New York City.
St. Regis Paper Co., New York City.

BAGGING MACHINES—For Filling Sacks

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Bagpak, Inc., New York City.
St. Regis Paper Co., New York City.
Sackett & Sons Co., The A. J., Baltimore, Md.

BAG PILERS

Link-Belt Company, Philadelphia, Chicago.

BEARINGS

Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

BELT LACING

Sackett & Sons Co., The A. J., Baltimore, Md.

BELTING—Chain

Atlanta Utility Works, East Point, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

BELTING—Leather, Rubber, Canvas

Sackett & Sons Co., The A. J., Baltimore, Md.

BOILERS—Steam

Atlanta Utility Works, East Point, Ga.

BONE BLACK

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Huber & Company, New York City.

BONE PRODUCTS

American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

BORAX AND BORIC ACID

American Potash and Chem. Corp., New York City.
Pacific Coast Borax Co., New York City.

BROKERS

Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Dickerson Co., The, Philadelphia, Pa.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
Keim, Samuel L., Philadelphia, Pa.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

BUCKETS—Elevator

Link-Belt Company, Philadelphia, Chicago
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

A Classified Index to Advertisers in
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BUYERS' GUIDE

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Advertisers, see page 33

BUCKETS—For Hoists, Cranes, etc., Clam Shell, Orange Peel, Drag Line, Special; Electrically Operated and Multi Power

Hayward Company, The, New York City.
Link-Belt Company, Philadelphia, Chicago.

BURNERS—Sulphur

Chemical Construction Corp., New York City.

BURNERS—Oil

Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.

CABLEWAYS

Hayward Company, The, New York City.

CARBONATE OF AMMONIA

American Agricultural Chemical Co., New York City.
DuPont de Nemours & Co., E. I., Wilmington, Del.

CARS—For Moving Materials

Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CARTS—Fertilizer, Standard and Roller Bearing

Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.

CASTINGS—Acid Resisting

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Duriron Co., Inc., The, Dayton, Ohio.

CASTINGS—Iron and Steel

Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CEMENT—Acid-Proof

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Chemical Construction Corp., New York City.

CHAIN DRIVES—Silent

Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CHAINS AND SPROCKETS

Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CHAMBERS—Acid

Chemical Construction Corp., New York City
Fairlie, Andrew M., Atlanta, Ga.

CHEMICAL APPARATUS

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Duriron Co., Inc., The, Dayton, Ohio.
Monarch Mfg. Works, Inc., Philadelphia, Pa.

CHEMICALS

American Agricultural Chemical Co., New York City.
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Bradley & Baker, New York City.
DuPont de Nemours & Co., E. I., Wilmington, Del.
Huber & Company, New York City.

CHEMICALS—Continued

International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Phosphate Mining Co., The, New York City.
Wellman, William E., Baltimore, Md.

CHEMICAL PLANT CONSTRUCTION

Atlanta Utility Works, East Point, Ga.
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CHEMISTS AND ASSAYERS

Gascoyne & Co., Baltimore, Md.
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Stillwell & Gladding, New York City.
Wiley & Company, Baltimore, Md.

CLUTCHES

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Stedman's Foundry and Mach. Works, Aurora, Ind.

CONCENTRATORS—Sulphuric Acid

Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.

CONDITIONERS AND FILLERS

American Limestone Co., Knoxville, Tenn.
Dickerson Co., The, Philadelphia, Pa.
Phosphate Mining Co., The, New York City

CONTACT ACID PLANTS

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COPPER SULPHATE

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COTTONSEED PRODUCTS

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Huber & Company, New York City
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

CRANES AND DERRICKS

Hayward Company, The, New York City.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

CYANAMID

American Agricultural Chemical Co., New York City
American Cyanamid Co., New York City.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Jett, Joseph C., Norfolk, Va.
Wellmann, William E., Baltimore, Md.

DENS—Superphosphate

Chemical Construction Corp., New York City.
Stedman's Foundry and Mach. Works, Aurora, Ind.

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22 Marietta Street Building ATLANTA, GA.

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Link-Belt Company, Philadelphia, Chicago

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Link-Belt Company, Philadelphia, Chicago.
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Sackett & Sons Co., The A. J., Baltimore, Md.

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Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

ENGINES—Steam

Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.

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Link-Belt Company, Philadelphia, Chicago.
Link Belt Speeder Corp., Chicago, Ill., and Cedar
Rapids, Iowa.

FERTILIZER MANUFACTURERS

American Agricultural Chemical Co., New York City.
American Cyanamid Company, New York City.
Armour Fertilizer Works, Atlanta, Ga.
Farmers Fertilizer Company, Columbus, Ohio.
International Minerals and Chemical Corporation, Chicago, Ill.
Phosphate Mining Co., The, New York City.
U. S. Phosphoric Products Division, Tennessee Corp.,
Tampa, Fla.

FISH SCRAP AND OIL

Ashcraft-Wilkinson Co., Atlanta, Ga.
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Bradley & Baker, New York City.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Wellmann, William E., Baltimore, Md.

FOUNDERS AND MACHINISTS

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Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

GARBAGE TANKAGE

Wellmann, William E., Baltimore, Md.

GEARS—Machine Moulded and Cut

Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

GEARS—Silent

Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

GELATINE AND GLUE

American Agricultural Chemical Co., New York City.

GUANO

Baker & Bro., H. J., New York City.

HOISTS—Electric, Floor and Cage Operated, Portable

Hayward Company, The, New York City.

HOPPERS

Atlanta Utility Works, East Point, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

IMPORTERS, EXPORTERS

Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Wellmann, William E., Baltimore, Md.

IRON SULPHATE

Tennessee Corporation, Atlanta, Ga.

INSECTICIDES

American Agricultural Chemical Co., New York City.

LACING—Belt

Sackett & Sons Co., The A. J., Baltimore, Md.

LIMESTONE

American Agricultural Chemical Co., New York City.
American Limestone Co., Knoxville, Tenn.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
McIver & Son, Alex. M., Charleston, S. C.
Wellmann, William E., Baltimore, Md.

LOADERS—Car and Wagon, for Fertilizers

Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Acid Making

Atlanta Utility Works, East Point, Ga.
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Chemical Construction Corp., New York City.
Duriron Co., Inc., The, Dayton, Ohio.
Fairlie, Andrew M., Atlanta, Ga.
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Coal and Ash Handling

Hayward Company, The, New York City.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Elevating and Conveying

Atlanta Utility Works, East Point, Ga.
Hayward Company, The, New York City
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Grinding and Pulverizing

Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

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MACHINERY—Power Transmission

Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Pumping

Atlanta Utility Works, East Point, Ga.
Duriron Co., Inc., The, Dayton, Ohio.

MACHINERY—Tankage and Fish Scrap

Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MAGNETS

Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MANGANESE SULPHATE

McIver & Son, Alex. M., Charleston, S. C.
Tennessee Corporation, Atlanta, Ga.

MIXERS

Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

NITRATE OF SODA

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Barrett Division, The, Allied Chemical & Dye Corp., New York City.
Bradley & Baker, New York City.
Chilean Nitrate Sales Corp., New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

NITRATE OVENS AND APPARATUS

Chemical Construction Corp., New York City.

NITROGEN SOLUTIONS

Barrett Division, The, Allied Chemical & Dye Corp., New York City.

NITROGENOUS ORGANIC MATERIAL

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
DuPont de Nemours & Co., Wilmington, Del.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Smith-Rowland Co., Norfolk, Va.
Wellmann, William E., Baltimore, Md.

NOZZLES—Spray

Monarch Mfg. Works, Philadelphia, Pa.

PACKING—For Acid Towers

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Chemical Construction Corp., New York City.

PANS AND POTS

Stedman's Foundry and Mach. Works, Aurora, Ind.

PHOSPHATE MINING PLANTS

Chemical Construction Corp., New York City.

PHOSPHATE ROCK

American Agricultural Chemical Co., New York City.
American Cyanamid Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Coronet Phosphate Co., New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Phosphate Mining Co., The, New York City.
Ruhm, H. D., Mount Pleasant, Tenn.
Schmaltz, Jos. H., Chicago, Ill.
Southern Phosphate Corp., Baltimore, Md.
Virginia-Carolina Chemical Corp. (Mining Dept.), Richmond, Va.
Wellmann, William E., Baltimore, Md.

PIPE—Acid Resisting

Duriron Co., Inc., The, Dayton, Ohio.

PIPES—Chemical Stoneware

Chemical Construction Corp., New York City.

PIPES—Wooden

Stedman's Foundry and Mach. Works, Aurora, Ind.

PLANT CONSTRUCTION—Fertilizer and Acid

Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.

POTASH SALTS—Dealers and Brokers

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
Jett, Joseph C., Norfolk, Va.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

POTASH SALTS—Manufacturers

American Potash and Chem. Corp., New York City.
Potash Co. of America, New York City.
International Minerals & Chemical Corp., Chicago, Ill.
United States Potash Co., New York City.

PULLEYS AND HANGERS

Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

PUMPS—Acid-Resisting

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Duriron Co., Inc., The, Dayton, Ohio.
Monarch Mfg. Works, Inc., Philadelphia, Pa.

PYRITES—Brokers

Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., New York City.
Wellmann, William E., Baltimore, Md.

QUARTZ

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.

RINGS—Sulphuric Acid Tower

Chemical Construction Corp., New York City.

ROUGH AMMONIATES

Bradley & Baker, New York City.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

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Stedman's Foundry and Mach. Works, Aurora, Ind.

SCRAPERS—Drag

Hayward Company, The, New York City.

SCREENS

Atlanta Utility Works, East Point, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

SEPARATORS—Air

Sackett & Sons Co., The A. J., Baltimore, Md.

SEPARATORS—Including Vibrating

Sackett & Sons Co., The A. J., Baltimore, Md.

SEPARATORS—Magnetic

Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

SHAFTING

Atlanta Utility Works, East Point, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

SHOVELS—Power

Link-Belt Company, Philadelphia, Chicago.
Link-Belt Speeder Corporation, Chicago, Ill., and Cedar
Rapids, Iowa.
Sackett & Sons Co., The A. J., Baltimore, Md.

SPRAYS—Acid Chambers

Monarch Mfg. Works, Inc., Philadelphia, Pa.

SPROCKET WHEELS (See Chains and Sprockets)

STACKS

Sackett & Sons Co., The A. J., Baltimore, Md.

SULPHATE OF AMMONIA

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Barrett Division, The, Allied Chemical & Dye Corp., New
York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
Hydrocarbon Products Co., New York City.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

SULPHUR

Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Freeport Sulphur Co., New York City.
Texas Gulf Sulphur Co., New York City.

SULPHURIC ACID

American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.

SULPHURIC ACID—Continued

U. S. Phosphoric Products Division, Tennessee Corp.,
Tampa, Fla.
Wellmann, William E., Baltimore, Md.

SUPERPHOSPHATE

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
U. S. Phosphoric Products Division, Tennessee Corp.,
Tampa, Fla.
Wellmann, William E., Baltimore, Md.

SUPERPHOSPHATE—Concentrated

Armour Fertilizer Works, Atlanta, Ga.
International Minerals & Chemical Corporation, Chicago, Ill.
Phosphate Mining Co., The, New York City.
U. S. Phosphoric Products Division, Tennessee Corp.,
Tampa, Fla.

SYPHONS—For Acid

Monarch Mfg. Works, Inc., Philadelphia, Pa.

TALLOW AND GREASE

American Agricultural Chemical Co., New York City.

TANKAGE

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Smith-Rowland, Norfolk, Va.
Wellmann, William E., Baltimore, Md.

TANKAGE—Garbage

Huber & Company, New York City.

TANKS

Sackett & Sons Co., The A. J., Baltimore, Md.

TILE—Acid-Proof

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.

TOWERS—Acid and Absorption

Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.

UNLOADERS—Car and Boat

Hayward Company, The, New York City.
Sackett & Sons Co., The A. J., Baltimore, Md.

UREA

DuPont de Nemours & Co., E. I., Wilmington, Del.

UREA-AMMONIA LIQUOR

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VALVES—Acid-Resisting

Atlanta Utility Works, East Point, Ga.
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Duriron Co., Inc., The, Dayton, Ohio.
Monarch Mfg. Works, Inc., Philadelphia, Pa.

WHEELBARROW (See Carts)

ZINC SULPHATE

Tennessee Corporation, Atlanta, Ga.

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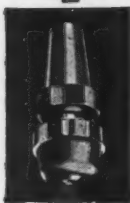
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See Catalog 6-C

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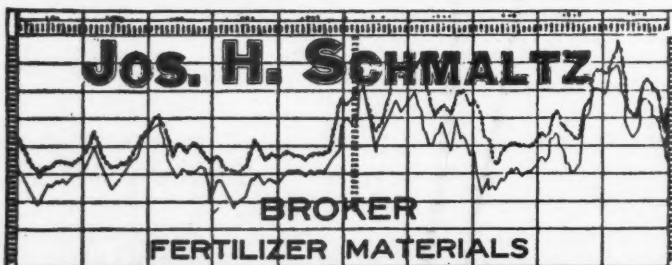
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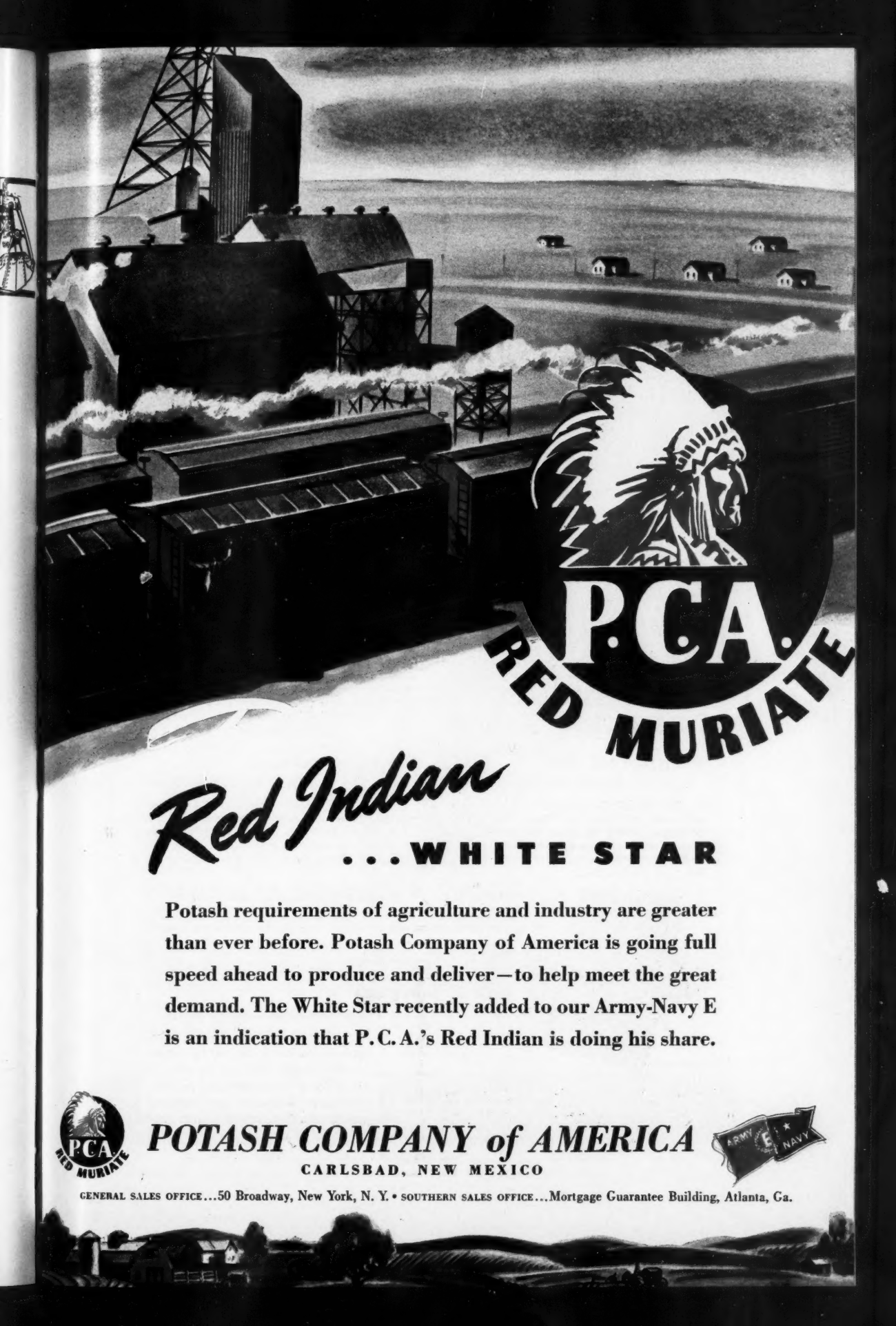
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